

WHAT IS CLAIMED IS:

1. An ashing method comprising the steps of:

holding a substrate having a resist mask formed through an insulating film in a chamber of an ashing apparatus; and

5 applying an RF electric power to activate an oxygen-containing gas introduced in the chamber in order to perform ashing of the resist mask, while an RF electric power is applied to the substrate.

2. The ashing method according to claim 1, wherein the RF electric power (W_b) applied to the substrate is controlled to be a
10 predetermined value or higher.

3. The ashing method according to claim 2, wherein the RF electric power (W_b) is 150 W or higher.

4. The ashing method according to claim 1, wherein the RF electric power (W_s) for activating the oxygen-containing gas is 1000 W
15 or less.

5. The ashing method according to claim 1, wherein a ratio (W_s/W_b) of the RF electric power (W_s) for activating the oxygen-containing gas to the RF electric power (W_b) applied to the substrate is controlled to be a predetermined value or lower.

20 6. The ashing method according to claim 5, wherein the ratio (W_s/W_b) is 5 or less.

7. The ashing method according to claim 1, wherein the ratio (W_s/W_b) is set so that the change rate of the dielectric constant of the insulating film before and after ashing is 10 %.

25 8. The ashing method according to claim 1, wherein the

substrate is set to a temperature of about 20°C or lower.

9. The ashing method according to claim 1, wherein the insulating film formed on the substrate is a low dielectric constant film having a dielectric constant of 3.5 or less.

5 10. The ashing method according to claim 1, wherein the RF electric power applied for activation of the oxygen-containing gas is supplied by a first power source and the RF electric power applied to the substrate is supplied by a second power source via a lower electrode formed in the chamber.

10 11. The ashing method according to claim 10, wherein the lower electrode supports the substrate and is controlled to have a predetermined temperature for maintaining the temperature of the substrate.

15 12. The ashing method according to claim 1, wherein the oxygen-containing gas is an oxygen gas, an ozone gas, a mixture thereof, or a mixture of either or both of these gases with a N₂ gas or a CF₄ gas.